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ABSTRACT

This science unit is designed primarily for newcomer Chinese students and for those who are continuing in the Chinese Bilingual Pilot Program, sponsored through the Elementary and Secondary Education Act, Title VII. It is designed for limited and non English speaking students. The unit is on kinds of soils and how poor soil is made better. Activities, experiments, and a list of main terms in both languages are included. Answers to the activities are provided. (SW)

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地上的寶藏
The Earth's Treasure

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SOIL 土壤

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PREFACE

This Science Unit is primarily for the newcomer Chinese students and for those who are continuing in the Chinese Bilingual Pilot Program, ESEA Title VII at the middle school level. It is designed for limited and non-English speaking students.

The unit is on The Earth's Treasure: Soil - Kinds of Soils and How Poor Soil is Made Better. There is a list of main terms in both languages, activities, and experiments at the end of the unit. Answers to the activities are also included.

序　言

本書是爲三藩市中美語文教育計劃下之初中學生而編。目的是幫助在英上有困難的新移民學生。他們以學習英語爲第二種語言。

自然課本的編寫是採取單元制。本單元是關於土壤 — 宅的種類及改良。除課本外，尙有中英對照及習作。書後附有答案以供學生自學之用。

Alice Lee 李潔蓮
San Francisco, CA
1979

Picture Credits

1. Brandwein, Paul F. et al. Concepts in Science. Sacramento: State Department of Education, 1967. P. 1, 3, 7, 8, Cover.

2. Zinn, Gilbert A. Science is Comparing. New York: Cambridge Book Company, 1977. P. 2.

土壤

農作物是我們主要食料的來源。所有農作物要有土壤才能生長。人類和動植物的存亡，與土壤有着密切的關係。我們日常所用和所見的東西，直接或間接地，都是從土壤而來的。我們可以說地上最重要的寶藏，不是金銀珠寶或其他礦物，而是土壤。

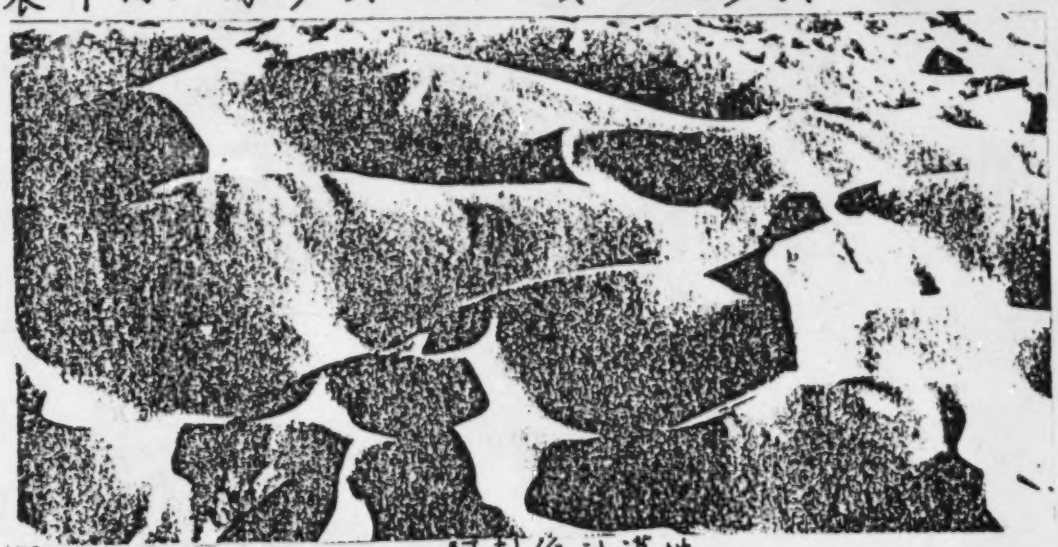
無論在甚麼地方，你也可以看到泥土。讓我們看看泥土裏有些甚麼？把半杯泥土放在白紙上，用放大鏡來看。我們看到碎石，

沙泥，枯乾的植物，昆蟲的軀壳，或骨頭羽毛等。有時候也會看到蟲類或別的細小生物。泥土中有水份，有空氣，有礦物質等類的東西。

土壤的種類

土壤大概可以分為以下數種：

1. 沙質土：含沙的成份多，沙粒是鬆散的，不能保持水份和養料，易濕也易乾，也容易被太陽晒熱。所以沙土地是不適宜種植農作物。像沙漠地的土質便是沙質土。



This is a desert in Saudi Arabia. 阿剌伯沙漠地

2. 黏質土：這種土壤含有很多黏土，不容易讓水通過。在下雨和溶雪的時候，大量水份停留在這些黏質土上，很久也不會乾涸。這種土質也不容易給太陽晒熱。但在乾旱的夏天時，因為水量少，而太陽的熱力又那麼

强，黏質土反而會被晒得像石頭般堅硬；空氣不易透過，植物的根很難伸長發展。黏質土地也是不適宜於種植農作物。

3.腐植土：這種土壤含有大量的腐植質。腐植質是動植物死後的物體在土裏腐化。這種土質鬆軟，能够保持大量水份和空氣，又容易被太陽晒熱。腐植土是很適宜於植物的生長。像森林中的土質便是腐植土。

4.沃土：這種土質是介於沙土和腐植土之間。含沙粒和黏土的份量很適宜，保持水份和排泄水份也很適當。沃土是種植農作物最好的土壤。

土壤的改良

貧瘠土壤是沒有足夠養料來供給植物生長的需要。但是我們可以用以下幾種方法把土壤改良。

施肥：把肥料放進貧瘠的土壤，可以使瘦土變為肥田。肥料可以分為以下兩類(1)動物肥料：如骨粉及家畜糞料等。(2)化學肥料：是由土地發掘而來的一種物質。這些物質不需要經過腐化作用，放進貧瘠的土壤，會使植物長得肥壯。

別的方法是輪植：輪植就是輪流種植不同的農作物。棉從泥土中吸收某一種物質，豆類花生等會把棉所取的物質放回土壤。這樣便再可以種植棉花。

還有些方法是在收成後，讓泥土休息一段時期不種農作物。把田地犁鬆，放些肥料，當野草生長後，把它們和泥土融和。這樣，瘦土便會成為良田，用來種植農作物。

蚯蚓對泥土很有益處。當牠們在地上爬行時，從牠們身體排泄出來的物體，含有豐富的氮氣。所有植物是需要氮氣來生長的。

中英對照：

農作物 —	produce
來源 —	source
泥土，土壤 —	soil
寶藏 —	treasures
放大鏡 —	magnifying glass
蟲 —	worms
礦物質 —	minerals
沙質土 —	sand
養料 —	food
濕 —	wet
乾 —	dry
沙漠 —	desert
粘質土 —	clay
堅硬 —	hard
根 —	roots
腐植土 —	humus
物體 —	materials
腐化 —	decay
植物 —	plant
森林 —	woods
沃土 —	loam
介於 —	in between
保持 —	hold
排泄 —	passes through
貧瘠 —	poor
施肥 —	fertilize
肥料 —	fertilizers
動物肥料 —	animal fertilizers
骨粉 —	bone meal
家畜糞料 —	cattle manure
化學肥料 —	chemical fertilizers
發掘 —	dug
物質 —	substances
棉 —	cotton
犁鬆 —	plow
野草 —	weeds
蚯蚓 —	earthworms
爬行 —	crawl
氮氣 —	nitrogen

練習：

A. 將適當的英文字句填在空白上：

magnifying glass, woods, soil, produce, minerals, fertilizers, decay, humus, clay, sand, root, cotton.

1. 肥料 fertilizers
2. 粘質土 _____
3. 農作物 _____
4. 沙質土 _____
5. 放大鏡 _____
6. 根 _____
7. 土壤 _____
8. 礦物質 _____
9. 腐植土 _____
10. 森林 _____
11. 腐化 _____
12. 棉 _____

B. 在下面找出這些名字，找到後把它們圈出來：

produce, materials, sand, earthworms, treasures, clay, desert, humus, plow, woods, fertilizers, loam, nitrogen, cattle.

A F B E C M O L V Z E E

T E A R T H W O R M S U

T R E E H U J A S A N D

O T V K Z M O M G T I Q

D I T L E U D E S E R T

C L A Y W S T U N R M E

N I T R O G E N J I U S

E Z P R O D U C E A T O

A E R A D O N E P L O W

T R E A S U R E S S G Q

D S O C A T T L E H V K

練習：

C. 想想看：

1.地上最重要的寶藏是甚麼?

_____

_____

2.那一種土壤是最適宜於種植農作物? 爲甚麼?

_____

_____

3.試寫寫改良土壤的幾種方法?

_____

_____

D. 做實驗：

我們試做以下實驗，證明泥土中有空氣。

拿一杯水，半杯泥（圖一），把水慢慢的倒進有泥土的杯裡（圖二），把水和泥攪和。

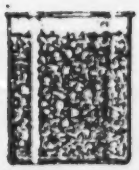
(一)

(二)

練習：

D. 做實驗：

現在看看（圖三）有些什麼從泥土中升浮上水面呢？ _____



(三)

那些水泡就是氣泡，當你把水和泥土攪和的時候，在泥土中的空氣便藉着水而形成氣泡上升，與房間的空氣混合。

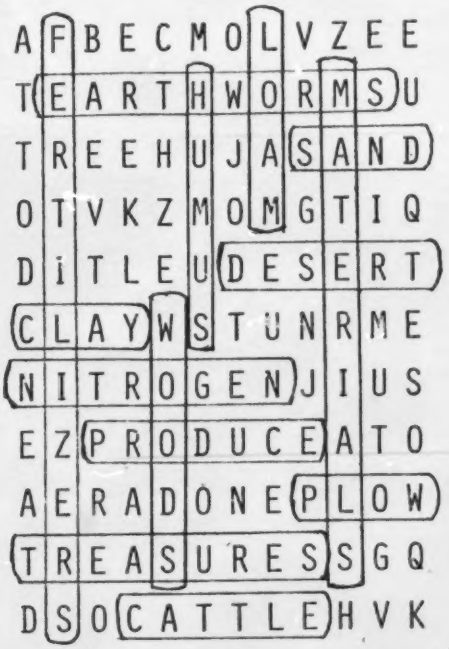
現在試答這問題：

泥土中有空氣嗎？ _____

習作答案：

A. 1. fertilizers 2. clay 3. produce 4. sand
5. magnifying glass 6. root 7. soil 8. minerals
9. humus 10. woods 11. decay 12. cotton

B.


A F B E C M O L V Z E E
T E A R T H W O R M S U
T R E E H U J A S A N D
O T V K Z M O M G T I Q
D I T L E U D E S E R T
C L A Y W S T U N R M E
N I T R O G E N J I U S
E Z P R O D U C E A T O
A E R A D O N E P L O W
T R E A S U R E S S G Q
D S O C A T T L E H V K

C. 1. 地上最重要的寶藏是土壤。

2. 沃土是最適宜於種植植農作物，它是介於沙土和腐質土之間。含沙粒和粘土的份量很適宜，保持水份和排泄水份也很適當。

3. 學生發表意見。

D. 水泡。 有。

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